MODIS IOT Weekly Report
Mission Operations Days: 2001/181 to 2001/187
June 29, 2001 20:00:00 GMT to July 06, 2001 20:00:00 GMT

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MODIS powered up on PS1/CPA, on day 183, 20:59:00, and is now collecting science data (see below).

TMON 69 built and loaded, but not currently enabled. Monitors EPS current for rise above 1.8 amps. If so, MODIS shuts down.

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Terra Spacecraft and MODIS Instrument Status:

Terra (AM-1) is in Normal Mode
MODIS is in A-side Science Mode

Blackbody		A On; B Off	Nominal
Calibration Electronics		A On; B Off	Nominal
Control Processor		A On; B Off	Nominal
Door:	Nadir	Unlatched, open	Nominal
	Space View	Unlatched, open	Nominal
	Solar Diffuser	Unlatched, closed	Nominal
FDDI Formatter		A On; B Off	Nominal
FDDI Port		A On; B Off	Nominal
FIFO Memory		1 & 2 On; 3 & 4 Off	Nominal
Format Processor		A On; B Off	Nominal
Power Supply:	1	On	Nominal
	2	Off	Nominal
PV FPAs:	VIS	A On; B Off	Nominal
	NIR	A On; B Off	Nominal
	SMIR	A On; B Off	Nominal
	LWIR	A On; B Off	Nominal
PC FPA:	LWIR	A On; B Off	Nominal
Radiative Cooler:			
	Outgas Heaters	All Off	Nominal
	LWIR FPA Heater	On	Nominal
	SMIR FPA Heater	Off	Nominal
Scan Assembly		A On; B Off	Nominal
SDSM		Off	Nominal
SRCA		Off	Nominal
Survival Heaters:	PS1	Enabled	Nominal
	PS2	Enabled	Nominal
Timing Generator		A On; B Off	Nominal
Flight Software		Rev BD + 2 patches	Nominal
Inhibit Ids Set		None	Nominal
TMON 68		Enabled	Nominal
TMON 69		Disabled	Nominal

This Week's Completed MODIS Activities:

Saturday, June 30, 2001
None

Sunday, July 1, 2001
None

Monday, July 2, 2001

183/19:06:50 – 19:09:04	Real Time	Turned on MODIS using power supply 1 (PS1), control processor B (CPB).
183/19:14:32 – 19:14:51	Real Time	Reset Control Processor B to Upload Mode
183/19:16:31 – 19:17:17	Real Time	Dumped CPB Startup code memory
183/19:39:41 – 19:40:01	Real Time	Restarted CPB with ASTATE = 0
183/20:06:04 – 20:10:43	Real Time	Turned off MODIS
183/20:57:04 – 20:58:52	Real Time	Turned on MODIS using PS1, CPA.
183/21:14:24 – 21:15:05	Real Time	Ran macro 0 to clear spurious loads
183/22:48:16	Real Time	MODIS transition to A-side SCIENCE mode
183/22:52:29	Real Time	Reset Formatter A to Upload Mode
183/22:53:20 – 22:54:21	Real Time	Loaded two Formatter Anomaly recovery memory patches
183/22:55:02	Real Time	Restarted formatter A with ASTATE = 0

Tuesday, July 3, 2001

184/00:19:20 – 00:21:11	Real Time	Dumped formatter error counts and addresses
184/00:21:35 – 00:24:39	Real Time	Enabled telemetry alarms for formatter anomaly mnemonics and disabled blackbody temperature alarms
184/00:25:20 – 00:35:31	Real Time	Dump formatter anomaly patches to verify integrity
184/18:06:50 – 18:08:10	Real Time	Turned on A-side Black Body (BB) to 315K
184/18:08:47 – 18:09:31	Real Time	Set Blackbody temperature to 290K
184/18:10:21 – 18:10:27	Real Time	Enabled Blackbody temperature alarms

Wednesday, July 4, 2001
None

Thursday, July 5, 2001
None

Friday, July 6, 2001
None

This Week's Scheduled MODIS Activities Not Completed:

None

Upcoming MODIS Events:

In the month of July, MODIS will be performing SRCA spatial, radiometric, and spectral calibrations, a black body calibration, and weekly SD/SDSM calibrations.

Friday, July 6, 2001

187/20:55:17 ATC OA-16: SD/SDSM Screened Calibration
187/22:34:10 ATC OA-15: SD/SDSM Open Calibration

Saturday, July 7, 2001
None

Sunday, July 8, 2001
None

Monday, July 9, 2001
None

Tuesday, July 10, 2001

191/16:45? Real-time FOT Set IRU to high rate for roll maneuver; less pointing accuracy
191/18:09:37 ATC Move Formatter to Night ahead by 3:23 to ensure 50/50 day/night
191/18:18:53 ATC FOT begins spacecraft roll slew to –11.7504 degrees
191/18:24:40 ATC Set Formatter to Day Rate
191/18:24:42 ATC Set SCIABNORM Flag to ABNORM
191/18:24:44 ATC Set PC band DC Restore to OFF
191/18:24:46 ATC Set PV band DC Restore to OFF
191/18:24:48 ATC Set Sector Rotation to –3072 (Earth Aperture to view Space view and OBCs)
191/18:31:18 ATC Set Sector Rotation to Zero (Normal)
191/18:31:20 ATC Set PV band DC Restore to ON
191/18:31:22 ATC Set PC band DC Restore to ON
191/18:31:24 ATC Set SCIABNORM Flag to NORM
191/18:31:26 ATC Set Formatter to Night Rate
191/18:36:33 ATC Spacecraft has returned to nominal attitude
191/18:45? Real-time FOT set IRU to low rate after roll maneuver; nominal pointing
191/19:03:51 ATC Move Formatter to Day later by 1.23 to ensure 50/50 day/night
Note: should have been 19:05:51, collecting 2 extra minutes of day rate data

Wednesday, July 11, 2001

192/10:33:05 – 11:30:36 ATC OA-23: SRCA Full Spatial
192/21:14:00 ATC OA-15: SD/SDSM Open
192/22:05:18 – 22:38:51 ATC OA-19: SRCA Full Radiometric
192/22:52:53 ATC OA-16: SD/SDSM Screened

Thursday, July 12, 2001

193/12:53:15 – 13:44:54 ATC OA-22: SRCA Full Spectral Part 1A
193/14:47:34 – 15:22:19 ATC OA-22: SRCA Full Spectral Part 2A
193/16:11:10 – 17:02:26 ATC OA-22: SRCA Full Spectral Part 3A
193/18:05:21 – 18:43:19 ATC OA-22: SRCA Full Spectral Part 4A
193/21:00:00 ATC Set Blackbody temperature to 270K

Friday, July 13, 2001

194/15:00:00 ATC Set Blackbody temperature to 280K
194/19:00:00 ATC Set Blackbody temperature to 285K
194/22:00:00 ATC Set Blackbody temperature to 290K

Saturday, July 14, 2001

195/02:00:00 ATC Set Blackbody temperature to 295K
195/02:00:30 ATC Set Blackbody duty cycle to FULL
195/04:00:00 ATC Set Blackbody temperature to 300K
195/06:00:00 ATC Set Blackbody temperature to 315K
195/09:00:00 ATC Set Blackbody temperature to 270K
195/09:00:30 ATC Set Blackbody duty cycle to THIRD

Sunday, July 15, 2001

196/05:00:00 ATC Set Blackbody temperature to 290K

Maneuvers:

The next MODIS Lunar Roll Calibration is scheduled for DOY 191 from 18:24:48 to 18:31:18. The roll was delayed by two orbits to avoid conflict with the CLAMS field campaign.

MODIS Anomalies:

Quick Summary:

On July 2, 2001 (DOY 183), at 20:59:00, MODIS was powered up on power supply 1 (PS1), control processor A (CPA). It was then commanded to A-side SCIENCE mode. The events leading up to this are as follows:

On June 15th, 2001, at 03:56:08 GMT, MODIS experienced an anomaly.

The Flight Operations Team paged the on-call MODIS engineer reporting a trip of TMON #68 (autonomous Telemetry Monitoring software on the spacecraft). TMON #68 is the MODIS double FIFO (First In, First Out data buffer) Write State TMON. In addition, many red limit violations were reported. Inspection of telemetry showed peculiar states including a CP (Control Processor) mode of INVALID and the MODIS model as ENGINEERING. With all telemetry

suspect, the MODIS IOT commanded the instrument to low-power mode (using procedure MOD_ALL_OFF) at 05:16:43.

Evidence was very strong that a failure had occurred in PS2 and that the rest of the instrument was okay. There was still the question about whether the failure was a soft failure or a hard failure. If the failure was a hard failure (such as an electrical short), it was possible that powering up PS2 could possibly stress the loads (those components still internally enabled on MODIS from the time of the PS2 shut off) with an over voltage. However, if the failure was a soft failure (such as a Single Event Upset (SEU) caused by a high-energy particle impact), it was possible that powering up PS2 would return it to full operational capability.

On June 28th (day of year 179), at 18:59:30, MODIS was powered on using power supply 1 (PS1) and control processor B (CPB). The 1553 bus stopped sending telemetry, and at the time, there were questions about the current values. At 19:09:00, the MOD_ALL_OFF procedure was executed and MODIS was again turned OFF.

On July 2nd (day of year 183), at 19:06:50, MODIS was once again powered ON using PS1 and CPB. After commanding to upload mode and doing a formatter restart, everything appeared to be okay for the remainder of the contact. At the beginning of the next contact,, MODIS was no longer sending valid telemetry (master cycle was no longer incrementing). At this time, MODIS was powered OFF. At 20:57:04, MODIS was powered up using PS1 and CPA. Since everything looked nominal at this time, MACRO 0 was executed in real time by the MODIS IOT. At 22:48:16, MODIS was transitioned to A-side SCIENCE mode, and software patches were loaded to account for the formatter A anomaly. At the time of the transition to side A science, the formatter reset itself 65536 times in the first 4 hours 40 minutes (half of which came in the first 5 minutes). However, since approximately 2 PM on July 3rd, no new formatter resets have been received.

As of this time, MODIS is operating nominally on PS1, CPA. L1A science data is also nominal.

General Instrument Comments:

MODIS is in Science Mode on the A-side with the SVD and NAD open, operating with the Formatter Resolution Flight Software Patches (FRFSP).

MODIS Telemetry Trends:

Voltage, current and temperature trending over the previous month, in addition to selected past time periods is currently underway to support the ongoing analysis of the PS2 shutdown anomaly.

Non-MODIS Significant Events:

SSR Anomaly:

Late in the evening of June 16, 2001, the Solid State Recorder (SSR) locked up. The SSR was no longer recording data and was not responding to commands uplinked by the Terra Flight

Operations Team (FOT) to dump its data. This made it impossible for the ground to acquire any recorded housekeeping telemetry or science data from the Terra spacecraft.

After further testing and analysis, the SSR was restored to full operations (successfully dumping science data) at 11:40:34 GMT on June 20, 2001.

An interesting byproduct of this event was the functional restoration of supersets 30 and 31 (which, after reallocation of the supersets, they now reside in the MISR buffer). Additionally, ASTER's superset allocation was reduced by one superset to solve a complication with replays of their science data. This free superset has been allocated to the MODIS buffer. With the restoration of the malfunctioning supersets (which are no long allocated to the MODIS buffer), and the additional superset, MODIS will have approximately 3% greater science data storage space than originally allocated.

Limited Life Item Status:

SRCA 10W Lamp #1: 186.1 of 500 hours
SRCA 10W Lamp #2: 143.0 of 500 hours
SRCA 10W Lamp #3: 152.2 of 500 hours
SRCA 10W Lamp #4: 61.5 of 500 hours

SRCA 1W Lamp #1: 557.6 of 4000 hours
SRCA 1W Lamp #2: 276.3 of 4000 hours

Solar Diffuser Door: 1633 of 3022 Movements
Nadir Aperture Door: 532 of 1316 Movements
Space View Door: 437 of 1316 Movements